Required Report - public distribution

Date: 7/13/2015

GAIN Report Number: TH5085

Thailand

Biofuels Annual

2015

Approved By:
Bobby Richey,
Agricultural Counselor

Prepared By:
Sakchai Preechajarn,
Agricultural Specialist,
Ponnarong Prasertsri,
Agricultural Specialist

Report Highlights:
TH5085 - Thailand's 10-year Alternative Energy Development Plan (2012 – 2021) remains unchanged targeting the use of ethanol at 9 million liters/day and B100 at 7.2 million liters/day in 2021, respectively. Production of both ethanol and biodiesel continues to grow in line with consumption.

Post:
Bangkok

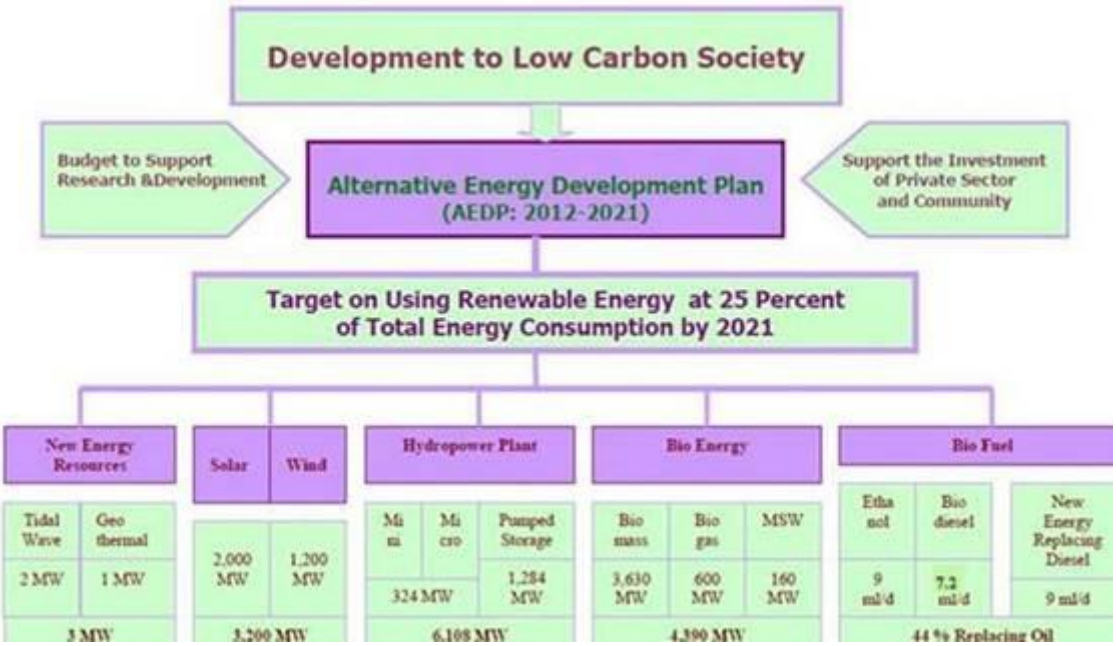
Executive Summary:
Thailand's 10-year Alternative Energy Development Plan (2012 – 2021) remains unchanged targeting the use of ethanol at 9 million liters/day and B100 at 7.2 million liters/day by 2021, respectively.
Ethanol production is forecast to increase by 10 percent in 2016 in response to growing demand for gasohol. Molasses-based ethanol dominates the ethanol market, accounting for 70 percent of total ethanol production, with the rest from cassava. The number of ethanol plants is expected to increase from 21 plants in 2015 to 22 plants in 2016, adding another 400,000 liters/day to the current production capacity of 4.8 million liters/day.
Ethanol consumption should rise to 1.27 billion liters in 2015 and 1.40 million liters in 2016 due to growing demand for E20 and E85 gasohol. The higher demand is being fueled by the government's price subsidies and the expansion of E20 and E85 gasohol stations and cars.
B100 or blended biodiesel production is estimated to further grow to 1.21 billion liters in 2015 and 1.25 billion liters in 2016. As for 2016, it is estimated that about 72 percent of B100 production will be derived from crude palm oil (CPO) or refined bleached deodorized palm oil (RBDPO), 21 percent from palm stearin, and 7 percent from palm free fatty acid (FFA). The production trend is in line with B100 consumption which is expected to grow marginally in 2015 and 2016 mainly because the government is likely to maintain its mandatory use of B7 fuel while the diesel market shows only small growth.
Due to fierce competition between Thailand's B100 processors, newcomers have been reluctant to enter the market since 2010. Some establishments have already suspended their operations. As a result, only 10 producers currently have active operations with an estimated total production capacity of 5.4 million liters per day or 1.63 billion liters per annum.

Author Defined:
1. Policy and Program

Fuel Use Projections (Million Liters)										
Calendar Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Gasoline Total	9,300	9,580	9,870	10,170	10,480	10,800	11,120	11,450	11,790	12,140
Diesel Total	21,480	21,700	21,920	22,140	22,360	22,580	22,810	23,040	23,270	23,500
On-road	11,694	11,695	11,696	11,697	11,698	11,699	11,700	11,701	11,702	11,703
Agriculture	5,092	5,206	5,320	5,434	5,548	5,662	5,781	5,900	6,019	6,138
Construction/mining	172	176	179	183	187	191	195	199	203	207
Shipping/rail	310	317	324	331	338	345	352	359	367	374
Industry	4,212	4,306	4,401	4,495	4,589	4,684	4,782	4,881	4,979	5,078
Heating	0	0	0	0	0	0	0	0	0	0
Jet Fuel Total	5,920	6,100	6,280	6,470	6,660	6,860	7,070	7,280	7,500	7,730
Total Fuel Markets	36,700	37,379	38,071	38,779	39,500	40,240	40,999	41,769	42,560	43,370

Source: FAS/Bangkok Forecast

The 10-year Alternative Energy Development Plan (2012 – 2021), which was approved by the Thai Cabinet in 2011, remains unchanged. The objective of the plan is to increase the share of renewable and alternative energy from the existing 9.4 percent of total energy consumption to 25 percent by 2021. The objective is mainly to reduce the country's dependency on fossil fuels. The plan also aims to strengthen domestic energy security, promote integrated green energy utilization in communities, enhance the development of alternative energy industries, and increase research and develop renewable energy technology for competitiveness in the global market.



1.1 Ethanol

The Government's goal is to increase ethanol consumption to 9 million liters per day by 2021. Ethanol consumption increased to around 3.5 million liters per day in the first four months of 2015, up from an average of 3.2 million liters per day in 2014. The Government is still promoting the use of E20 and E85 gasohol consumption through price incentives. The subsidies make ethanol blends 20 to 40 percent cheaper than E10 Octane 95 gasoline. The price subsidies are paid by the State Oil Fund. The Government continues to provide gasoline stations marketing subsidies totaling 1-2 baht/liter (12-23 US cent/gallon) and 2-3 baht/liter (58-70 US cent/gallon) to entice them to expand sales of E20 and E85 gasohol. In addition, the government continues to support the manufacturing of E20 vehicles which are compatible with E20 and E85 gasohol. The excise tax rate for the manufacturing of the Eco-cars (less than 1,300 cc engines with fuel consumption rate of 5 liters per 100 km.) is at 17 percent compared to 30 percent for E10 vehicles. Also, the Government will give an additional 3 percent reduction in the excise tax rate in 2016 for the manufacturing of Eco-cars which use E85 gasohol.

In order to meet the plan's ethanol consumption targets, feedstock supplies must increase in the future. Under the plan, the target is to increase sugarcane acreage and yields to more than 15 metric tons per rai (94 tons/hectare) compared to the current average yield of 12 metric tons per rai (75 tons/hectare). The Government encourages rice farmers in unproductive areas to shift to sugarcane under the 5-year Agricultural Restructuring Program (MY2015/19 – MY2019/20). Planted area of sugarcane is likely increase by 0.7 million rai (112,000 hectares) from MY2015/16 to MY2017/18. The plan also aims to increase the average cassava yield to more than 5 tons per rai (31 tons/hectare) with total production of 35 million metric tons per year.

1.2 Biodiesel

The Thai Government has set a B100 consumption target at 7.2 million liters per day by 2021. The plan focuses on both supply and demand. To meet the demand, the government has targeted oil palm acreage at 5.5 million rai (880,000 hectares) by 2021. Average yields are expected to reach 3.2 MT/rai (30 MT/hectare) in 2021 while crude palm oil crushing rates should be above 18 percent. On the demand side, the government anticipates balancing its compulsory production of biodiesel with domestic palm oil supplies. The plan also introduces pilot projects for B10 or B20 blend use in fleet trucks and fishing boats.

The government also intends to support the research and development with a plan called "Future New Fuel for Diesel Substitution," which encourages cultivation of new energy crops (jatropha and

micro algae), diesohol (blending ethanol with diesel), and oil conversion technology (Bio Hydrofined Diesel: BHD, and Biomass to Liquid: BTL) between 2014-2017. The target for new commercial production capacity is 2 million liters per day in 2018 and up to 25 million liters per day by 2021. Thai Oleochemicals Company, a subsidiary company of PTT Global Chemical Public Company, introduced a BHD product into the market in 2013. Total sales of BHD are reportedly about 50,000-80,000 liters per day.

2. Ethanol

2.1 Production

Table 2.1 Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)

Calendar Year	2007	2008	2009	2010	2011	2012	2013	2014	2015 E	2016 F
Beginning Stocks	70	87	48	44	49	59	21	43	40	22
Fuel Begin Stocks	52	68	62	24	22	58	20	21	26	21
Production	223	384	482	521	613	790	1,048	1,070	1,275	1,418
Fuel Production	192	336	419	451	486	471	950	1,058	1,265	1,400
Imports	2	4	7	5	6	7	7	8	7	7
Fuel Imports	0	0	0	0	0	0	0	0	0	0
Exports	15	66	16	48	139	304	64	8	5	5
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption	193	359	477	474	471	530	969	1,073	1,295	1,420
Fuel Consumption	176	342	456	454	450	509	949	1,053	1,270	1,400
Ending Stocks	87	48	44	49	59	21	43	40	22	22
Fuel Ending Stocks	68	62	24	22	58	20	21	26	21	21
Production Capacity (Million Liters/Day)										
Number of Refineries	7	11	11	19	19	19	21	21	21	22
Nameplate Capacity	0.96	1.6	1.7	2.9	2.9	3.2	3.9	4.4	4.8	5.2
Capacity Use (%)	64%	66%	78%	49%	58%	67%	74%	68%	73%	75%
Co-product Production (1,000 MT)										
Co-product A	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Co-product B	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Total Feedstock Use (1,000 MT)										
Sugarcane	57	60	160	194	486	654	760	882	933	1,000
Molasses	745	1,414	1,541	1,452	1,981	2,218	2,655	2,895	3,545	3,962
Cassava	240	197	557	925	768	1,311	2,231	1,864	970	1,158
Rice	0	0	0	0	0	0	0	0	500	500
Market Penetration (Million Liters)										
Fuel Ethanol	176	342	456	454	450	509	949	1,053	1,270	1,400
Gasoline	7,337	7,121	7,524	7,418	7,331	7,705	8,233	8,567	8,820	9,300
Blend Rate (%)	2.4%	4.8%	6.1%	6.1%	6.1%	6.6%	11.5%	12.3%	14.4%	15.1%

In 2016 ethanol production is forecast to increase to around 1.4 billion liters, up around 10 percent from 2015 in anticipation of growing demand for gasohol (Table 2.1). The number of ethanol plants is expected to increase by 1, to 22 with production capacity of 5.2 million liters per day, up 8 percent from 2015. The new plant will produce cassava-based ethanol. Production capacity of cassava-based ethanol plants will increase to about 1.9 million liters per day. Molasses-based ethanol still dominates Thailand's overall ethanol production, accounting for around 70 percent of fuel ethanol with production capacity of around 2.8 million liters per day. Demand for molasses will likely continue to increase to around 4 million metric tons. Meanwhile, the use of rice stocks in ethanol production is likely to be limited to 0.5 million metric tons per year to avoid negative impact on domestic prices of cassava. This rice will come from government stocks. The sole sugar-based ethanol plant is expected to operate at full capacity of around 230,000 liters per day using around 1 million metric tons of sugarcane.

In the first four month of 2015, fuel ethanol plants operated at an average of around 3.5 million

liters per day, which was about 70 percent of full capacity. Molasses-based ethanol still dominates Thailand's overall ethanol production, accounting for around 65 percent. The number of operating fuel ethanol plans will likely remain unchanged at 21 in 2015. However, production capacity is expected to increase to around 4.8 million liter per day, up 9 percent from 2014. The increase is driven by growing demand for gasohol. Of 21ethanol plants in Thailand, 14 are molasses-based with production capacity of 2.9 million liters per day. This compares to 2.7 million liters per day capacity in 2014. Some molasses-ethanol manufacturers doubled their production capacity to facilitate anticipated sugarcane acreage expansion for their new sugar facilities. The sole sugarcane-based ethanol plant increased its production capacity by 15 percent to 230,000 liters per day in 2015. The reminding 6 plants use cassava with production capacity likely to increase to 1.7 million liters per day, compared to 1.5 million liters per day in 2014.

Total ethanol production is likely to increase to around 1.265 billion liters in 2015, up 20 percent from 2014. This will result in higher demand for feedstock which will likely to be filled primarily by molasses (See TH5047, Sugar Annual 2015). The demand for molasses is expected to increase to 3.5 million metric tons, compared to 2.9 million metric tons in 2014. Meanwhile, demand for cassava is likely to decline around 1 million metric tons (producing around 155 million liters of ethanol), compared to 1.9 million metric tons in 2014 (producing around 300 million liters of ethanol) in anticipation of the substitution of rice for cassava, particularly for imported cassava from Cambodia. This is driven by the sales of non-food grade rice from the government stocks. It is expected that around 0.5 million metric tons of the government rice will be used on ethanol production in 2015, producing around 190 million liters of ethanol. This will account for approximately 17 percent of total ethanol production in Thailand.

The production of non-fuel ethanol is controlled by the government. The Liquor Distillery Organization (LDO), which is under the authority of the Excise Department of the Ministry of Finance, has a monopoly on the production of industrial grade ethanol in Thailand with a production capacity of approximately 60,000 liters per day. Meanwhile, domestic demand for industrial grade ethanol, particularly for medical, pharmacy, paints and cosmetics uses, is around 50,000 liters per day. The primary feedstock for industrial ethanol production is molasses and cassava.

2.2 Consumption

In 2016, fuel ethanol consumption is forecast to increase to 1.4 billion liters (3.8 million liters/ day), up around 10 percent from 2015. This is due mainly to growing consumption of E20 (a mixture of 20 percent ethanol and 80 percent gasoline) and E85 gasohol (a mixture of 85 percent ethanol and 15 percent gasoline). The demand for E20 and E85 gasohol will be driven by government's price subsidies and the expansion the E20 and E85 gasohol stations. Gasohol consumption is expected to trend upward to around 9.6 billion liters (or 26 million liters per day) in 2016, up 8 percent from 2015. Consequently, the average ethanol blending rate will likely increase to around 15 percent, compared to 14 percent in 2015.

In the first four month of 2015, ethanol consumption increased to around 0.4 billion liters (3.5 million liters/day), up 17 percent from the same period last year. This was due to an increase in gasohol consumption to 3.6 billion liters (or around 24 million liters per day), up 15 percent from the same period last year (Table 2.2). Consumption of gasohol accounted for around 95 percent of total gasoline consumption. E20 and E85 gasohol consumption continued to increase significantly accounting for 20 percent of total gasohol consumption due to the government prices subsidies. Also, consumption of E10 gasohol increased 14 to 15 percent from the same period last year at the expense of premium gasoline. Despite a reduction in petroleum prices, consumption of Octane 95 premium gasoline continued to decline as the retail price is 20-50 percent higher than gasohol prices. In addition, the retail price of E85 gasohol which is still heavily subsidized by the government is approximately 20 percent cheaper than E10 gasohol (Table 2.3). Meanwhile, E20 retail price is 7 percent below E10 gasohol. Also, the number of E20 and E85 gasohol stations continued to increase nationwide, particularly for E85 gasohol station which nearly doubled in May 2015, compared to 385 stations last year. The number of E20 and E85 vehicles currently account

for more than half of total gasoline vehicles.

Table2.2: Thailand's Gasoline and Gasohol Consumption (Unit: Million Liters)

Type of Gasoline	2009	2010	2011	2012	2013	2014	Jan. - May 2014	Jan. - May 2015	% Change 2015/2014
Gasoline	**3,054**	**3,035**	**3,119**	**3,250**	**763**	**559**	**243**	**239**	**-1.5**
Regular (octane 91)	2,877	2,958	3,077	3,208	147	61	27	31	16.3
Premium (octane 95)	177	77	42	42	616	498	216	208	-3.7
Gasohol	**4,470**	**4,383**	**4,213**	**4,455**	**7,470**	**8,008**	**3,200**	**3,673**	**14.8**
- Gasohol E10 Octane 91	1,415	1,552	1,860	2,121	3,337	3,595	1,442	1,651	14.5
- Gasohol E10 Octane 95	2,972	2,692	2,122	1,932	3,030	2,735	1,125	1,282	14.0
- Gasohol E20	83	137	222	367	963	1,344	522	606	16.1
- Gasohol E85	0.25	2.11	9.10	36	141	334	112	134	20.0
Total	**7,524**	**7,418**	**7,332**	**7,705**	**8,233**	**8,567**	**3,443**	**3,913**	**13.6**

Source: Department of Energy Business, Ministry of Energy

Table 2.3: Price Structure of Petroleum Product in Bangkok (as of July 7, 2015)

	Premium gasoline (octane 95)	Gasohol			
		E10 Octane 95	E10 Octane 91	E20	E85
Ex-Refinery Factory Price	17.5332	18.6212	18.3876	19.6152	25.1465
Excise Tax	5.6000	5.0400	5.0400	4.4800	0.8400
Municipal Tax	0.5600	0.5040	0.5040	0.4480	0.0840
State Oil Fund	6.1500	0.4500	-0.0500	-1.9000	-7.2300
Conservation Fund	0.2500	0.2500	0.2500	0.2500	0.2500
Wholesale Price (WS)	30.0932	24.8652	24.1316	22.8932	19.0905
Value Added Tax (VAT)	2.1065	1.7406	1.6892	1.6025	1.3363
WS+VAT	32.1997	26.6058	25.8209	24.4957	20.4268
Marketing Margin	3.2339	2.3311	2.2983	2.2283	2.5731
VAT	0.2264	0.1632	0.1609	0.1560	0.1801
Retail Price	35.66	29.10	28.28	26.88	23.18

Note: Exchange rate = 33.6 baht/$

Source: Petroleum Division, Enery Policy and Planning Office, Ministry of Energy

In 2015, domestic demand for ethanol is likely to increase to around 1.3 billion liters (3.5 million liters/day). Gasohol consumption is expected to increase to around 9 billion liters (24 million liters/day), up around 10 percent from 2014. The government will likely continue to promote consumption of E20 and E80 gasohol by subsidizing prices 10 to 20 percent below E10 gasohol through the State Oil Fund.

2.3 Trade

Ethanol exports will likely be minimal in 2015 and 2016 due mainly to growing domestic demand for ethanol. In 2014, ethanol exports declined significantly to around 8 million liters (Table 2.4).

All ethanol exports are industrial grade ethanol which is primarily exported to the Philippines. Meanwhile, there were no imports of ethanol for gasohol production in 2014 due to sufficient domestic supplies. The Thai government imposes a 2.5 baht/liters (29US cents/gallon) on ethanol imports.

Table 2.4: Thailand's Exports of Ethanol [1/]

Unit: Million Liters

	2010	2011	2012	2013	2014	Jan. - May		
						2014	2015	% change
Philippines	5.5	61.3	142.3	45.9	8.2	8.2	-	-
Singapore	19.3	68.5	76.8	-	-	-	-	-
Japan	20.0	16.5	24.9	8.8	-	-	-	-
Australia	-	2.1	-	-	-	-	-	-
Taiwan	1.2	3.2	1.5	-	-	-	-	-
Indonesia	-	0.0	1.5	-	-	-	-	-
Europe	-	-	9.3	9.1	-	-	-	-
South Korea	2.1	12.8	45.5	-	-	-	-	-
Other	0.0	2.6	2.1	0.0	-	-	-	-
Total	**48.2**	**167.0**	**303.9**	**63.8**	**8.2**	**8.2**	-	-

Note: 1/ Based on on-line ethanol plants exporting 95% purity ethanol

Source: Department of Alternative Energy Development and Efficiency, Ministry of Energy

2.4 Stocks

Ethanol stocks are expected to be decline to around 20 million liters in 2015 and 2016 in anticipation of growing demand for gasohol consumption. Most fuel ethanol manufacturers mainly supply their ethanol for domestic refineries for gasohol production. Consequently, their total storage capacities will be limited to only around one month of domestic use.

3. Biodiesel

3.1 Production

Table 3.1 Biodiesel Production and Use in Thailand

Biodiesel (Liters - specify unit)										
Calendar Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Beginning Stocks	0	6	7	8	22	12	22	32	22	32
Production	68	448	610	660	630	900	1,060	1,170	1,210	1,250
Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	62	447	609	646	640	890	1,050	1,180	1,200	1,220
Ending Stocks	6	7	8	22	12	22	32	22	32	62
BalanceCheck	0	0	0	0	0	0	0	0	0	0
Production Capacity										
Number of Biorefineries	5	9	14	13	13	10	10	10	10	10
Nameplate Capacity	475	840	1,970	1,970	1,970	1,450	1,450	1,450	1,630	1,630
Capacity Use (%)	14.3%	53.3%	31.0%	33.5%	32.0%	62.1%	73.1%	80.7%	74.2%	76.7%
Feedstock Use (1,000 MT)										
RBDPO/CPO	45	300	400	445	390	630	775	825	835	855
Stearin	20	125	170	180	190	200	210	235	240	250
FFA	0	0	0	0	20	20	25	55	80	85
Market Penetration (Liters - specify unit)										
Biodiesel, on-road use	62	447	609	646	640	990	1,050	1,180	1,200	1,220
Diesel, on-road use	11,200	10,580	11,080	11,100	11,510	12,340	12,500	11,590	11,693	11,810
Blend Rate (%)	0.3%	2.5%	3.3%	3.5%	3.3%	4.3%	5.0%	5.6%	5.6%	5.7%
Diesel, total use	18,677	17,634	18,465	18,490	19,192	20,565	20,892	21,071	21,260	21,480
Note:										
All PSD data are B100 or B100-equivalent (see statistical information section of Reporting Instructions).										
Place a number for beginning stocks in cell C5 to ensure the 2008 PS&Ds balance.										

B100 or unblended biodiesel in Thailand is currently produced from palm oil derived feedstock such as crude palm oil (CPO), refined bleached deodorized (RBD) palm oil, palm stearin, and free fatty acids of palm oil (FFA). B100 production is solely driven by government mandates, mainly aimed to help palm farmers.

B100 production is forecast to grow 3 percent to 1.25 billion liters in 2016 on a basis that the government's B7 mandate will be applied throughout the year, with only a marginal increase in consumption. It is estimated that about 72 percent of B100 is derived from RBDPO or CPO, 21 percent from palm stearin, and 7 percent from FFA. B100 production in 2015 is also estimated to increase by 3 percent to 1.21 billion liters in 2015.

Feedstock for unblended diesel or crude palm oil is forecast to recover to 2.2 million metric tons (MMT) given normal weather conditions and continued increase in harvested area. Based on a recent survey in major oil palm plantation areas, dry weather conditions throughout Thailand in 2014 and early 2015 are likely to affect oil palm production in 2015. Despite increased harvested area, trade sources reported that unfavorable weather is hurting not only fresh fruit bunch (FFB) output but also overall oil extraction rates, at least in the first four months of the year (Jan-Apr 2015). As a result, crude palm oil (CPO) production for 2015 is estimated to decline by 10 percent to 1.8 million metric tons (MMT) from 2.0 MMT in 2014.

Table 3.2 Thailand's Production, Supply and Demand for CPO[1/]

(Unit: 1,000 hectares) (Unit: 1,000 Metric Tons)

Oil, Palm	2013/2014		2014/2015		2015/2016		
Market Begin Year	Jan 2014		Jan 2015		Jan 2016		
Thailand	USDA Official	New Post	USDA Official	New Post	USDA Official	New Post	
Area Planted	0	0	0	0	0	0	(1000 HA)
Area Harvested	655	663	675	690	690	710	(1000 HA)
Trees	0	0	0	0	0	0	(1000 TREES)
Beginning Stocks	156	156	78	129	126	99	(1000 MT)
Production	2,150	2,000	2,000	1,200	2,200	2,200	(1000 MT)
MY Imports	24	24	75	50	20	20	(1000 MT)
MY Imp. from U.S.	0	0	0	0	0	0	(1000 MT)
MY Imp. from EU	0	0	0	0	0	0	(1000 MT)
Total Supply	2,330	2,180	2,153	1,979	2,346	2,319	(1000 MT)
MY Exports	222	271	350	50	200	100	(1000 MT)
MY Exp. to EU	0	0	0	0	0	0	(1000 MT)
Industrial Dom. Cons.	1,450	1,180	1,200	1,220	1,200	1,350	(1000 MT)
Food Use Dom. Cons.	510	550	550	560	550	570	(1000 MT)
Feed Waste Dom. Cons.	70	78	78	60	70	80	(1000 MT)
Total Dom. Cons.	2,030	1,730	1,828	1,840	1,820	2,000	(1000 MT)
Ending Stocks	78	129	128	99	186	219	(1000 MT)
Total Distribution	2,330	2,180	2,178	1,939	2,246	2,319	(1000 MT)
CY Imports	24	24	25	50	20	20	(1000 MT)
CY Imp. from U.S.	0	0	0	0	0	0	(1000 MT)
CY Exports	222	271	400	50	400	100	(1000 MT)
CY Exp. to U.S.	0	0	0	0	0	0	(1000 MT)
TS=TD	0	0	0	0	0	0	

[1/] See GAINS, TH5074 – Palm Oil PS&D Update, June 2015.

Due to fierce competition between Thailand's B100 processors, newcomers have been reluctant to enter the market since 2010. In addition, establishments, with the total capacity of 350,000 liter per day, have already suspended their operations because of their inability to compete. As a result, only 10 producers currently have active operations with an estimated total production capacity of 4.84 million liters per day or 1.45 billion liters per annum. The New Biodiesel Company expanded its B100 production capacities by 600,000 liters per day (180 million liters per annum) to 1 million liter per day in mid-2015.

Table 3.3 List of Operating B100 Producers in Thailand

	Company	Capacity (Liters per day)	Feedstock Type
1	Bangchak Petroleum	50,000	CPO, RBDPO
2	Pure Energy	800,000	Palm Stearin, CPO
3	Patum Vegetable Oil	1,400,000	CPO, RBDPO, Stearin
4	B. Grimm Green Power	200,000	CPO, RBDPO, Stearin
5	A.I. Energy	500,000	Palm Stearin
6	Veera Suwan	200,000	Palm Stearin, RBDPO
7	Thai Oleochemicals	685,800	CPO
8	New Biodiesel	1,000,000	CPO, RBDPO, Stearin, FFA
9	Absolute Power P	300,000	CPO, RBDPO, Stearin
10	Bangchak Biofuel	300,000	CPO, Stearin
	Total	5,435,800	

Source: Department of Energy Business and FAS Estimates

3.2 Consumption

The Government is likely to maintain its B7 mandate in 2016. As a result, B100 consumption in 2015 is estimated to grow slightly due mainly to a growth in diesel use. In response to reduced CPO supplies and skyrocketing prices in early 2015, the government temporarily lowered the mandatory vegetable oil content requirement in biodiesel by 50 percent from the mandate of B7 to B3.5 from January 22 to April 16, 2015. The mandatory use of B7 was eventually reinstated on April 17, 2015 onward after increased production of CPO entered the market following the harvest of fresh palm fruits.

B100 producers, especially those that are not part of integrated with CPO processors and petroleum oil refineries are struggling to survive, primarily because of higher production costs. Below is the historical implementation of mandatory use for specific biodiesel since 2007:

June 2007	Mandatory use of B2 and voluntary use of B5
June 2010	Mandatory use of B3 and voluntary use of B5
March 2011	Mandatory use of B2 and voluntary use of B5
May 2011	Mandatory use of B3-B5
July 2011	Mandatory use of B4
January 2012	Mandatory use of B5
July 19, 2012	Mandatory use of B3.5
November 1, 2012	Mandatory use of B5
January 1, 2014	Mandatory use of B7
February 17, 2014	Adjust mandatory use from B7 to B3.5
May 14, 2014	Return implementing mandatory use of B7
January 22, 2015	Adjust mandatory use from B7 to B3.5
April 17, 2015	Return implementing mandatory use of B7

Below is the composition of B5 biodiesel retail prices.

Table 3.4 Breakdown of B5 Biodiesel Retail Prices

	B7 Biodiesel (Baht/liter) as of July 3, 2014	B7 Biodiesel (Baht/liter) as of July 3, 2015
Ex-Refinery Prices	26.9723	17.1396
Excise Tax	0.0050	4.2500
Municipal Tax	0.0005	0.4250
Oil Fund Fee	0.0000	0.0500
Conservation Fund Fee	0.0250	0.2500
Wholesale Prices	26.2693	22.1146
Value Added Tax	1.8389	1.5480
Wholesale Prices + VAT	28.1082	23.6626
Marketing Margin	1.6279	1.8013
Value Added Tax	0.1140	0.1261
Retail Prices	**29.8501**	**25.5900**
Source: Ministry of Energy		

3.3 Trade/Policy

The Thai Government restricts the import of biodiesel to protect domestic palm growers. Thailand's biodiesel imports and exports are very small. Biodiesel exports were 1,870 metric tons (MT) in 2014, while the imports totaled 2,810 MT.

3.4 Ending Stocks

B100 production is driven solely by contracts between palm growers and refineries. As a result, the country's B100 stocks, held by either B100 producers or petroleum oil refineries, are quite low somewhere around 20-30 million liters or about ten days of utilization.

4. Advance Biofuels

A molasses-based ethanol plant recently opened a second production line using cane bagasse. This second generation biofuel pilot project was established between the Thai Roong Ruang Group, one of the largest sugar mills in Thailand, and the Japanese and Thai governments. The pilot project remains in the experimental stage with a production capacity of 10,000 liters/day mainly because the production costs remain higher than the first-generation ethanol derived from sugar molasses or cassava roots. With current low petroleum prices expected to continue into 2016, the feasibility of this project remains threatened.